

DESCRIPTIONS OF TWO NEW SPECIES OF *FULVIUS* STÅL
(HETEROPTERA: MIRIDAE: CYLAPINAE) FROM BRAZIL, WITH
BIOLOGICAL AND BIOGEOGRAPHIC NOTES ON THE GENUS

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Abstract.—Two new Brazilian species, *Fulvius paranaensis* from the state of Paraná and *F. vicosensis* from the state of Minas Gerais, are described. Male genitalia and photographs of both species are provided to assist in identification and notes on general biology and biogeography are given for the New World species of *Fulvius*.

Key Words: Heteroptera, Miridae, *Fulvius*, *paranaensis*, *vicosensis*, new species, Brazil, biology, biogeography

The clypine genus *Fulvius* Stål (1862) includes about 65 species worldwide (Carvalho and Costa 1994, Schuh 1995). Schuh (1976) discussed the phylogenetic position of *Fulvius* within Cylapinae, and Carvalho and Ferreira (1994) provided a key to the New World clypine genera, including *Fulvius*. Carvalho and Costa (1994) revised the New World *Fulvius*, described 22 new species, and included an identification key to the 42 known species. Most authors have recognized the placement of *Fulvius* in the clypine tribe Fulviini (e.g., Henry and Wheeler 1988, Carvalho and Ferreira 1994), but Schmitz and Štys (1973) argued to give the tribe subfamily status, an action rejected as premature by Schuh (1976). Schuh (1995) in his world catalog treated the tribe as a junior synonym of Cylapini, but more recently Gorczyca (2000), based on a cladistic analysis of the subfamily, recognized four tribes, including Fulviini. A complete list of references to the species of *Fulvius* can be found in Henry and Wheeler

(1988), Carvalho and Costa (1994), Schuh (1995), and Gorczyca (2000).

In this paper, we describe the two new Brazilian species, *F. paranaensis* from Paraná and *F. vicosensis* from Minas Gerais, to provide names for an ongoing faunal study. Provided are illustrations of male genitalia and photographs of both species to assist in identification and notes on biology and biogeography of the New World species of *Fulvius*.

Fulvius Stål 1862

Fulvius Stål 1862: 322. Type species: *Fulvius anthocoroides* Stål. Monotypic.

Diagnosis.—*Fulvius* is recognized by the small to medium size, elongate body, length 1.4 to 5.5 mm; dark castaneous to brown general color, most species with whitish areas at middle of clavus and base of cuneus; long, produced head; eyes extending ventrally to gula, gula long; horizontal or nearly horizontal frons; long rostrum, extending to metacoxae or beyond; trapeziform pron-

otum, with rounded lateral margins and a sinuate posterior margin; large confluent calli, occupying anterior two-thirds; prominent collar; broadly exposed mesoscutum; macropterous subparallel hemelytra, with well-developed membrane and 2 closed cells; greatly reduced ostiolar opening, auricle, and evaporative area; long, slender legs; long metatibiae, much longer than pro- or mesotibiae; 2-segmented tarsi; and slender claws, usually with a subapical tooth.

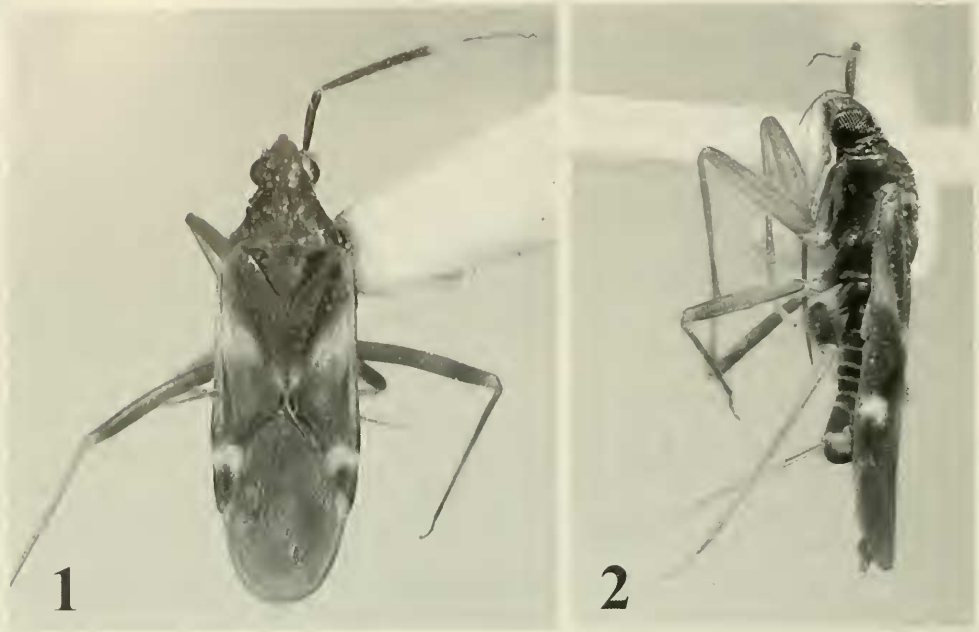
BIOLOGICAL NOTES

While very little specific information is available on the biology, evidence suggests that members of the genus are largely predaceous and, possibly, mycetophagous. Large numbers of *Fulvius* often are attracted to lights (Carvalho 1956, Maldonado 1969, Schuh 1976, Paula and Ferreira 1998), including *F. vicosensis*. *Fulvius imbecilis* (Say) has been observed feeding on dipterous and coleopterous larvae and other soft-bodied arthropods found in damp areas or on fungi under loose bark of poplar (*Populus* sp.) firewood (Kelton 1985). *Fulvius quadristillatus* (Stål) has been associated with fungi (Auricularia) growing on decaying trees at the headwaters of the Rio Negro, Amazon, Brazil (Carvalho 1954), and has been taken in large numbers from litter and kitchen middens where fungi are abundant (Schuh 1976), but also where there is an abundance of larvae that might serve as prey. One Old World species has been reared through multiple generations on butterfly eggs and larvae (Gorzycza 2000). *Fulvius paranaensis* was found feeding on liquified material of dead vertebrate carcasses, a nutrient source perhaps not too dissimilar from that acquired from various arthropod prey.

BIOGEOGRAPHIC OVERVIEW

Members of the genus *Fulvius* are most abundant in tropical regions of the world, with approximately 92 percent of species distributed between the Tropics of Cancer

and Capricorn. The majority of the species occur in the Neotropics. Prior to this study, Mexico had the largest number of species recorded (16 species), followed by Brazil (15 species) and Panama (13 species). Other countries range from 1 to 7 species. Fifty-eight percent of species are known from only one country, whereas 42 percent have been reported from two or more countries. The center of diversity for the New World species appears to be Mexico and possibly adjacent Central America, radiating northward into the United States and Canada and southward into Central and South America. *Fulvius anthocoroides* Stål has the largest range, occurring in 22 countries, followed by *F. bisbistillatus* (Stål) (17), *F. breddini* Reuter (12), *F. quadristillatus*, and *F. variegatus* Poppius (10). Insufficient collecting probably accounts for the limited distribution now known for many species. *Fulvius anthocoroides* is recorded from North America (United States [Florida only]), Central America (Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama), and South America (Bolivia, Brazil, Colombia, Ecuador [including Galapagos Islands], French Guiana, Guyana, Paraguay, Peru, Suriname, and Venezuela), extending into the Caribbean islands. The species *F. bisbistillatus*, *F. breddini*, and *F. quadristillatus* are also widely distributed, radiating from Mexico southward into South America. *Fulvius quadristillatus* also occurs in the Caribbean islands, and *F. breddini* is reported from the Galapagos islands. These last three mentioned species are sympatric with *F. anthocoroides* in almost all its distribution, except for North America. *Fulvius variegatus*, the species having the fourth largest geographic distribution, ranges in the Pacific region from Hawaii south throughout the Bismarck Archipelago (New Britain, New Guinea, New Ireland, and Samoa) and Micronesian Island groups (Kusiae, Palau, Ponape, Truck, Yap). With the addition of the two new species presented in this paper, Brazil becomes the most speciose country, having 17 spe-



Figs. 1-2. Photographs of *Fulvius paranaensis*, ♂. 1, Dorsal aspect. 2, Lateral aspect.

cies of *Fulvius*, and Minas Gerais, the most speciose Brazilian state, having seven species.

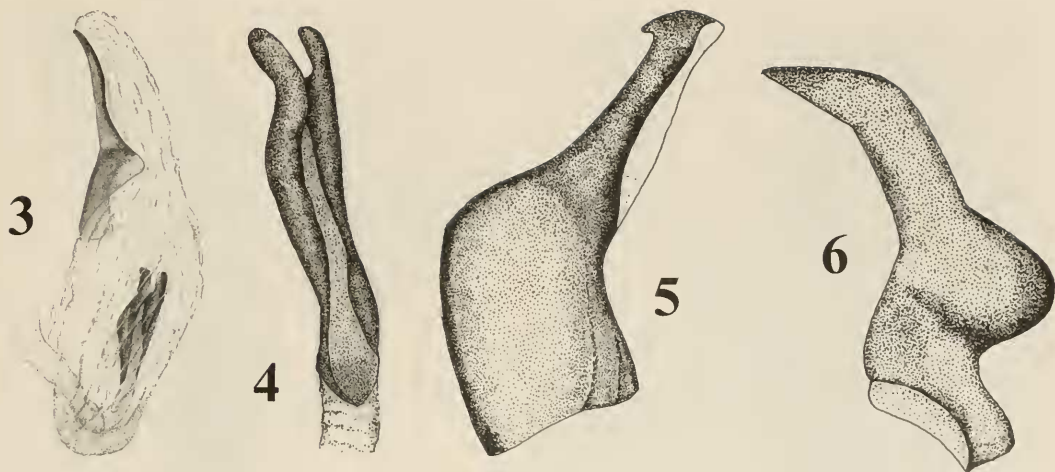
***Fulvius paranaensis* Ferreira and Henry, new species**
(Figs. 1-6)

Diagnosis.—*Fulvius paranaensis* keys roughly to *F. gampoensis* Carvalho and Costa, but differs from it and other species of the genus in having the metacoxa brown only on basal $\frac{1}{2}$ and pale apically (the mesocoxa is uniformly brown), antennal segment II narrowly pale on apical $\frac{1}{5}$, and by the male genitalic characters, particularly the shape of elongate secondary gonopore (Fig. 4), the apically hooked phallosome (Fig. 5), and the broad base of the left paramere (Fig. 6).

Description (Figs. 1-2).—Male (measurements include \bar{x} , followed by ranges in parentheses; $n = 4$): Length 4.31 mm (3.94-4.69 mm); width 1.25 mm (1.19-1.31 mm). *Head*: length 0.48 mm (0.52-0.45 mm); width 0.60 mm (0.60-0.62 mm); distance between eyes 0.29 mm (0.26-0.31

mm). *Antenna*: Segment I, length 0.48 mm (0.40-0.50 mm); II, 1.24 mm (1.16-1.33 mm); III, 0.50 mm (0.48-0.52 mm); IV, 0.71 mm (0.71 mm). *Pronotum*: Length 0.50 mm (0.48-0.50 mm); width 1.07 (1.10-1.05 mm). Length from cuneal fracture to apex of membrane 0.50 mm (0.48-0.50 mm); cuneal width 0.31 mm (0.26-0.33 mm).

General coloration dark brown with white and red areas. Head dark brown with apex of clypeus and outer margin of buccula red. Eye dark brown. Rostrum brown to fuscous, becoming darker apically, extending to middle of abdomen. Antenna fuscous, segment I reddish brown, segment II dark brown with apical $\frac{1}{4}$ white. Pronotum dark brown, collar with two fuscous spots; calli occupying $\frac{2}{3}$ of disc; posterior margin of pronotum concave with posterior angles rounded. Mesoscutum brown with lateral margins red. Scutellum brown. Hemelytron brown; irregular yellow band on base of corium extending to embolium and apex of clavus; base of cuneus white, apex dark brown; apical area of embolium near



Figs. 3–6. Male genitalia of *Fulvius paranaensis*. 3, Vesica. 4, Secondary gonopore. 5, Phallosome. 6, Left paramere.

cuneus, red; membrane fuscous, iridescent, with a small pale area near inner margin of cuneus. Ventral region dark brown. Pro- and mesolegs pale brown except coxae dark brown; metaleg with apical $\frac{1}{2}$ of coxa and trochanter whitish; setae short, erect or semierect. Head, xyphus, pronotum, propleura, mesoscutum, and scutellum shagreened, almost glabrous, except for very short setae on apical area of head. Antennal segments I and II with short erect or semierect setae ranging from shorter than, to as long as, diameter of segments; setae on segments III and IV longer than diameters of their respective segments; segment II slightly incrassate toward apex; relative lengths of antennal segments in ascending order I < III < IV < II. Male genitalia: Vesica (Fig. 3) without lobe or fields of spines and spicules. Secondary gonopore long (Fig. 4), with a lobe on each side. Phallosome reduced (Fig. 5), membranous, apex acuminate, posterior region enlarged. Right paramere very small and simple. Left paramere (Fig. 6) distally acute, with median lobe glabrous.

Female ($n = 3$).—Length 4.69 mm (4.69 mm); width 1.54 mm (1.50–1.56 mm). *Head*: Length 0.55 mm (0.50–0.60 mm); width 0.66 mm (0.64–0.67 mm); distance

between eyes 0.32 mm (0.31–0.33 mm). *Antenna*: Segment I length, 0.49 mm (0.48–0.50 mm); II, 1.06 mm (1.02–1.10 mm); III, 0.48 mm (0.48 mm); IV, 0.69 mm (0.62–0.74 mm). *Pronotum*: Length 0.60 mm (0.60 mm); width 1.27 mm (1.24–1.31 mm). Length from cuneal fracture to apex of membrane 0.49 mm (0.48–0.50 mm); cuneal width 0.32 mm (0.29–0.33 mm).

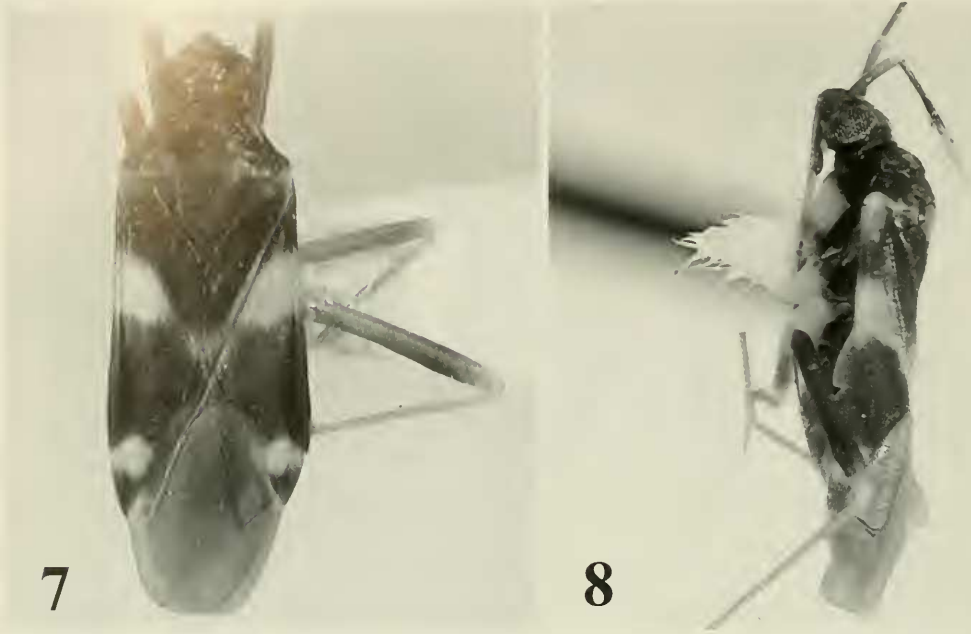
Similar to male in color, structure, and vestiture.

Type specimens.—Holotype ♂, Curitiba, PR, 30/I/94, M.O. Moura (Museu Nacional, Rio de Janeiro). Paratypes: Same locality as for holotype, with following dates: 3 ♂: 12/XI/1993, 30/I/1994, 20/I/1994; 3 ♀: 19/I/1994, 30/I/1994 and 27/I/1994 (all in Museu Nacional and Universidade Federal de Viçosa, MG, Brazil, except 1 ♂, 1 ♀ in National Museum of Natural History, Washington, DC).

Etymology.—Named for the state of Paraná, Brazil, in which this species occurs.

Distribution.—Curitiba, Paraná, Brazil.

Discussion.—According to Mr. Mauricio Moura (personal communication), the specimens were collected in a secondary forest at the Botanical Garden of Curitiba, feeding on the exudates of a dead animal in an advanced state of decomposition.



Figs. 7–8. Photographs of *Fulvius vicosensis*, ♀. 7. Dorsal aspect. 8. Lateral aspect.

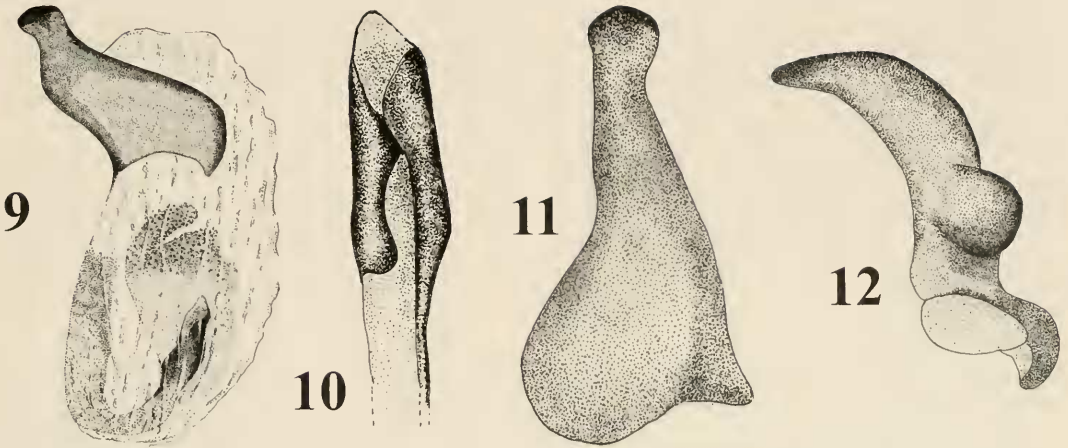
Fulvius vicosensis Ferreira and Henry,
new species
 (Figs. 7–12)

Diagnosis.—*Fulvius vicosensis* keys to *F. bisbistillatus* (Stål) in Carvalho and Costa (1994), but can be distinguished by the proportionately shorter second antennal segment having the apical $\frac{2}{5}$ white and the broader basal width of the pronotum. It also can be distinguished from all other species of the genus by the male genitalia, particularly the more elongate trough of the secondary gonopore (Fig. 10), the absence of an apical notch on the phallosome (Fig. 11), and the more bulbous base on the left paramere (Fig. 12).

Description.—Male (measurements include \bar{x} , followed by ranges in parentheses; $n = 10$): Length 3.53 mm (3.25–4.06 mm); width 1.17 mm (0.94–1.38 mm). **Head:** Length 0.43 mm (0.33–0.52 mm); width 0.55 mm (0.52–0.61 mm); distance between eyes 0.19 mm (0.17–0.21 mm). **Antenna:** Segment I length 0.43 mm (0.33–0.48 mm); II, 0.95 mm (0.88–1.07 mm); III, 0.49 mm (0.47–0.59 mm); IV, 0.62 mm (0.57–0.69

mm). **Pronotum:** Length 0.39 mm (0.33–0.47 mm); width 1.27 mm (1.24–1.31 mm). Length from cuneal fracture to apex of membrane 0.36 mm (0.33–0.48 mm); cuneal width, 0.23 mm (0.21–0.29 mm).

General color brown with white areas. Head dark brown with apex of clypeus pale; rostrum pale brown, becoming fuscous apically; antennal segment I brown with apex paler; segment II with apical $\frac{1}{3}$ white, other segments dark brown. Eye dark brown. Pronotum and collar dark brown. Mesonotum dark brown with lateral margins paler. Scutellum dark brown. Hemelytron dark brown with an irregular stripe extending through apex of clavus, basal area on corium and embolium yellow; base of cuneus white. Membrane darkened, slightly iridescent, area near inner margin of cuneus pale. Legs pale brown with coxae and trochanters pale; setae short, erect or semierect. Underside of body brown. Head, pronotum, propleuron, mesoscutum, and scutellum glabrous [or rubbed], except for short setae on apical area of head. Rostrum extending beyond metacoxae. Antennal segment I and II



Figs. 9–12. Male genitalia of *Fulvius vicosensis*. 9, Vesica. 10, Secondary gonopore. 11, Phallosome. 12, Left paramere.

with erect or semierect setae ranging from shorter than to as long as diameter of segments; setae on segments III and IV longer than diameters of their respective segments; antennal segment I longer than width between eyes; antennal segment II slightly incrassate toward apex, III and IV thinner; relative lengths of antennal segments in ascending order $I < III < IV < II$. Posterior margin of pronotum concave with posterior angles rounded; collar well defined; calli occupying anterior $\frac{2}{3}$ of pronotum. Hemelytron with short reclining setae. Ventral region of thorax glabrous (or rubbed); abdomen with short to relatively long simple setae. Male genitalia: Vesica (Fig. 9) with two fields of short spines near the secondary gonopore. Secondary gonopore (Fig. 10) short, apex acute. Phallosome (Fig. 11) small, membranous, apical half acuminate with apex enlarged and rounded. Right paramere small, simple. Left paramere (Fig. 12) falciform, median lobe glabrous.

Female (Figs. 7, 8) (measurements include \bar{x} , followed by ranges in parentheses; $n = 10$).—Length 3.67 mm (3.81–3.84 mm); width 1.13 mm (1.00–1.19). *Head*: Length 0.45 mm (0.38–0.50 mm); width 0.57 mm (0.52–0.60 mm); distance between eyes 0.20 mm (0.19–0.21 mm). *Antenna*: Segment I length 0.42 mm (0.36–0.48 mm);

II, 0.77 mm (0.76–0.98 mm); III, 0.53 mm (0.50–0.55 mm); IV, 0.71 mm (0.71 mm). *Pronotum*: Length 0.43 mm (0.40–0.45 mm); width 1.01 mm (0.93–1.05 mm). Length from cuneal fracture to apex of membrane 0.39 mm (0.36–0.45 mm); cuneal width, 0.23 mm (0.21–0.26 mm).

Similar to male in color, structure, and vestiture.

Type specimens.—Holotype ♂, Viçosa, Minas Gerais, Brasil, Armadilha Luminosa, Córrego do Paraíso, 17/03/1988, P. S. F. Fiuza (Museu Nacional, Rio de Janeiro) Paratypes: Same locality as for holotype, with following dates: 16 ♂: 23/II/1988, 09/XII/1982, 02/II/1986, 19/I/1983, 08/I/1988, 14/I/1993, 18/II/1983, 11/III/1983, 10/XII/1986, 01/VI/1983, 17/VI/82, 08/I/1988, 02/II/1983, 22/XII/1982, 05/III/1987; 17 ♀: 20/I/1982, 25/II/1982, 31/III/1987, 11/III/1987, 13/I/1987, 18/I/1988, 08/II/1993, 08/I/1988, 23/II/1988, 25/II/1986, 02/II/1983, 10/IV/1987, 23/VI/1982, 20/IV/1983, 12/II/1979, 24/II/1983 (all paratypes in Museu Nacional and Universidade Federal de Viçosa, MG, Brazil, except for 3 ♀ in National Museum of Natural History, Washington, DC).

Etymology.—Named for the city of Viçosa, Brazil, in which this species occurs.

Distribution.—Viçosa, Minas Gerais, Brazil.

Discussion.—The paratypes compare well with the holotype, varying in general color from paler to slightly darker. The specimens were collected in black light traps in a secondary forest at Viçosa known as "Mata do Córrego do Paraíso (20°46'–20°48'S; 45°50'–45°52'W)," characterized by Atlantic Forest vegetation, at an altitude of 600–700 meters, an annual average temperature of 18° C to 19° C, and an annual average precipitation of about 131.5 cm.

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